THE AIR TOXICS PROGRAM

Briefing Outline

- Air Toxics Program Overview
- The Status of the Air Toxic Program
- The Future of the Air Toxics Program

Air Toxics Program Overview

The Air Toxics Program

- Designed to characterize, prioritize, and equitably address the serious impacts of hazardous air pollutants on public health and the environment through a strategic combination of
  - regulatory approaches
  - voluntary partnerships
  - ongoing research and assessments
  - educational outreach

Current GPRA Goal

- By 2010, reduce air toxic emissions by 75 percent from 1993 levels to significantly reduce the risk to Americans of cancer and other serious adverse health effects caused by airborne toxics.

Components of the Air Toxics Program

- Source-specific standards and sector-based standards
  - MACT (Sections 112 and 129)
  - Residual Risk
  - Utilities study
- National, regional, community-based initiatives to focus on multi-media and cumulative risks
  - Integrated Urban Air Toxics strategy
  - Great Waters
  - Mercury initiatives
  - PBT and TMDL initiatives
  - Clean Air Partnerships
- National air toxics assessments (NATA)
  - Emission Inventories
  - Monitoring network
  - Air quality, exposure, and risk modeling
  - Ongoing research on effects and assessment tools
- Educational outreach

What are Air Toxics?

- 188 compounds listed in the Clean Air Act
- Pollutants which may cause cancer or other serious effects in humans or in the environment.
- Pollutants with health concerns resulting from both short and long term exposures
- Pollutants which may disperse locally, regionally, nationally, or globally and which after deposition may persist in the environment and/or bioaccumulate in the food chain
- Pollutants which possess a variety of physical and chemical characteristics that enhance their potential for multi-media exposures, i.e., air, soil, water

What Health & Environmental Effects Do They Cause?

- More than half are known or suspected to be human carcinogens
- Many known to affect respiratory, neurologic, immune, or reproductive systems: more susceptible or sensitive populations, e.g., children, may be at greater risk for some effects
- Known to have similar effects in many fish and animal species, including endangered species; also may affect hormonal systems (endocrine disruption)
- Environmental effects may be felt by individual species within ecosystem or by entire ecosystem where the affected species are found

Sources of Air Toxics

- Literally, thousands of sources
- Stationary sources include large industrial complexes like chemical plants, oil refineries, and steel mills
- Area sources which are small stationary sources like dry cleaners, gas stations, and small manufacturers
- Mobile sources include cars, trucks, buses, and non-road vehicles like ships and farm equipment

Status of the Air Toxics Program

MACT Program

MACT: Section 112 Program

- 188 Hazardous Air Pollutants initially listed in CAA
- 174 source categories listed by EPA
- Source categories divided into bins:

BIN	STATUTORY DATE	STANDARDS/ SOURCE CATEGORIES	PROPOSED TO DATE	PROMULGATED TO DATE
2 year	11/15/92	2 standards 6 source cat.	---	2 standards 6 source cat
4 year	11/15/94	18 standards 40 source cat	---	19 standards 40 source cat.
7 year	11/15/97	30 standards 41 source cat	4 standards 5 source cat.	21 standards 31 source cat. 5 delisted
10 year	11/15/00	59 standards 87 source cat	3 standards 3 source cat.	1 standard 1 source cat.

MACT: Emission Reductions to Date

- Estimate annual reductions of 1 million tons of air toxics
- 2.5 million tons of VOC emission reductions
- Expect an additional half a million tons in annual reductions in the next two years from standards proposed, but not yet finalized

MACT: The 7-year Bin

- Most of the 7 year rules have been completed
  - 21 standards covering 31 source categories promulgated
  - 5 source categories delisted
- 4 rules (covering 5 source categories) are under a court order for promulgation
  - Publicly Owned Treatment Works (POTW) - October 1999
  - Polymers & Resins III (2 categories) - December 1999
  - Pulp & Paper (combustion) MACT III - December 2000
  - Secondary Aluminum - December 1999

MACT: The 10-year Bin

- There are 59 10-year MACT standards
  - covering 87 source categories
- We are developing 43 of the 59 standards
- Delisting 2 source categories
- 14 source categories currently unfunded
- We are looking for ways to meet the CAA requirements

MACT: Section 129 Combustion Standards

- Municipal Waste Combustion (final 12/95)
- Hospital/Medical/Infectious Waste Incineration (final 9/97)
- Promulgate by November 2000:
  - Industrial/Commercial Waste Incinerators
  - Other Solid Waste Incinerators
  - Small MWC Units

MACT: Section 129 Combustion Standards Emissions

- MWC and MWI account for ~30% of national mercury emissions in the air
- When fully implemented will reduce mercury emissions by ~90%
  - MWC by 25 tons per year
  - MWI by 14 tons per year
- Will result in more than a 95% reduction in dioxin/furan emissions

The Residual Risk Program

Residual Risk: Purpose

- Assess post-MACT risk from source categories
- Set additional standards if risks exceed an "Ample Margin of Safety to protect public health"
  - Within 8 years of MACT promulgation
- Consider ecological effects
- Also, Report to Congress describes
  - Risk assessments methods for use across the Air Toxics Program
  - Approach for conducting residual risk analyses
  - Report released 3/3/99

Residual Risk: Risk Assessment Approach

- Will be consistent with Agency human health and eco risk assessment technical guidance and policies
- Will use a tiered approach
  - Screening level assessment
  - Refined assessment
- Depending on characteristics of HAPs, assessment will address:
  - Single or multiple pathways
  - Human and ecological endpoints

Residual Risk: Risk Management

- For carcinogens
  - Use linear dose response model unless data support threshold mechanism. Then use more complex analyses to predict at what concentrations effects may occur
  - Assume additivity for all carcinogens, or where data permit, consider chemical interactions (e.g., synergism/antagonism)
- For non-cancer effects
  - Use EPA reference concentration (RfC/RfD) or comparable criteria from other government agencies
  - Consider additivity for HAPs with similar health effects
- Base decisions on modeled air concentrations, or for refined assessments, estimate size and characteristics of exposed population

Residual Risk: Analyses Underway

- Of 22 2-year and 4-year standards, initiated 13 analyses
- Conducting risk analyses on a source category basis
- Based on these analyses, we will consider modifying our approach as appropriate

2 & 4 Year MACT Standards

- Due 2001:
  - Coke Ovens
- Due 2002:
  - Dry Cleaning
  - Comm. EO Sterilizers
  - Gas Distribution
  - Halogenated Solvent Cleaning
  - Industrial Cooling Towers
  - Magnetic Tape
- Due 2003:
  - Aerospace Manuf.
  - Chrome Electroplating
  - Petro. Refineries
  - Polymers & Resins I, II, IV
  - Sec. Lead Smelters
  - Shipbuilding
  - Wood Furniture
  - Marine Vessel Loading
  - Offsite-Waste
  - Printing/Publishing
  - HON

Risk Assessment Guidance

- Risk Assessment Guidelines, Mixtures (1986)
- New Cancer Guidelines (planned for 1999)
- Exposure Assessment (1992)
- Exposure Factors Handbook (1997)
- Risk Characterization (1992, 1995)
- Monte Carlo Probabilistic (1997)
- Ecological Risk Assessment (1996)
- NAS *Science and Judgment* (1994)
- Commission on Risk Assessment and Risk Management (1997)

Utilities Study

Utilities Study

- Study completed in February of 1998
- Currently collecting information to support regulatory determination
  - Issued information collection request (ICR) to utility industry
    - Final test reports to EPA by May 31, 2000
  - Will conduct (through ORD) analysis of potential control technologies
  - Continue analysis of health-related issues
- Regulatory determination scheduled for 12/15/00

Urban Air Toxics Strategy

Urban Air Toxics Strategy

- Draft Strategy Issued September 1998
  - list of 33 air toxics of concern
  - list of 34 area source categories
  - schedule for actions on mobile source controls
- Final Strategy due June 1999
- Deliverables in 2001

Urban Air Toxics Strategy: Goals

- 75% reduction in cancer "incidence"
  - Scope - national, from all stationary sources looking at all HAP
- "Substantial" reduction in noncancer "risks"
  - Scope - national, from only area sources, looking at all noncarcinogenic HAP
- Address disproportionate risk

Urban Air Toxics Strategy: Progress Assessment

- Iterative Analyses
  - Preliminary -- comparison of 1990 and 1996 emissions and ambient monitoring data
  - Periodic assessments - initially based on 1996 emission inventory
- Allow for evolution of methods over time
  - Improved tools and data
  - Progression from screening level to more complex

Urban Air Toxics Strategy: Assessment Approaches

- Three basic approaches:
  - Toxicity and/or population weighted emissions
  - Comparison between modeled ambient concentration or exposures and health-based benchmark values
    - ASPEN and HAPEM for national scale air quality and exposure modeling
    - ISC3 and HAPEM for urban/neighborhood scale modeling
    - TRIM for urban/neighborhood scale multimedia/multipathway modeling
  - Risk estimation based on estimated exposure and exposure-response relationships

Urban Air Toxics Strategy: Area Source Standards

- Options: How to develop standards
  - MACT
  - Traditional GACT
  - GACT (flexible)
- Options: Where standards apply
  - National standards apply everywhere
  - National standards apply only in urban areas
  - State and local standards

Urban Air Toxics Strategy: Other Activities

- Identify research needs
- Work in partnerships with State and Locals to develop programs that address the goals of the urban strategy
- Education and outreach

Great Waters Program

Great Waters Program

- 112(m) Requirements
  - Deposition assessment
  - Periodic Report to Congress
  - Regulatory determination
  - Monitoring for Great Lakes, Chesapeake Bay, and Coastal Waters
- 15 Pollutants of Concern
  - mercury, lead, and cadmium
  - nitrogen compounds
  - POM/PAHs, dioxins, and furans
  - PCBs and 7 banned/restricted pesticides

Great Waters Program: Accomplishments

- Two Reports to Congress Issued - May 1994, June 1997
- Adequacy determination issued March 1998 supporting Section 112 authorities
- Third Report to be Issued - August 1999

Great Waters Program: Current Directions

- Primary focus on nitrogen and mercury
- Reviewing list of pollutants of concern
  - working with overall PBT initiative
- Developing monitoring capabilities of NEPs
  - workshops and special studies
- Developing analytical tools and legal strategies
- Building Partnerships - OW, ORD, NOAA, NADP

Great Waters Program: Current Projects

- Great Lakes monitoring/studies
- Hg Deposition and TMDL Pilot
  - Florida Everglades Site 3a
  - Devils Lake, WI
- Expansion of NADP Sites
  - support to NEPs
- Air Deposition Studies
  - 7 NEP special studies this year

Mercury Study

Mercury Study

- Released in December 1997
- Assessment of US mercury emissions by source, the health and environmental implications of these emissions, and availability and cost of control
- Continued involvement in analysis of health data

National Air Toxics Assessments (NATA)

NATA: Federal Toxics Monitors

- 40 PAMS sites collect 8 HAPs VOCs (subset of 20 PAMs sites collect additional 2 aldehydes)
- 300 PM 2.5 Speciation sites will collect 10 of 11 HAP metals

NATA: Reported State Toxics Monitors

- State Data: varies yearly
  - (ex. Benzene 1990 - 1996)
  - States Reporting: 6-14
  - Monitoring sites: 93-235
- In 1996, 138 sites monitored Benzene
- 1992-1996~ 14 monitors operated continually
- 1987-1996 ~ 7 monitors operated continually

NATA: National Monitoring Network

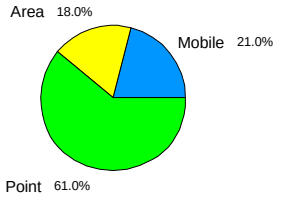
- Focus resources optimally by engaging partners to:
  1. Expand monitoring network by adding new sites
  2. Merge existing Fed/State sites where appropriate (e.g. PAMs & PM2.5 Speciation Trends sites)
  3. Target urban population-oriented sites
  4. Develop a common "CORE" list of compounds
  5. Implement a phased approach to expand the number of sites and compounds to fill data gaps

NATA: Emission Inventories

- Built program over several years and now have data sets for 1990, 1993 and 1996
- The 1996 National Toxic Inventory:
  - will be used for modeling and data analyses
  - 36 states contributed emission inventory information
  - To be completed in October 1999
- Have developed many emission factors, however many source categories/pollutants do not have factors

NATA: 1993 National Toxics Inventory

- Inventory includes 168 HAPs
- Total of 8.1 million tons of toxics emitted



NATA: Modeling

- Working toward a future focus on integrated multi-media/multi-pathway assessments
- Provide capability for regional and local scale assessments
- Brought ASPEN in-house and are developing our own infrastructure
  - Will use for national level assessment
- Will run the 1996 NTI through the model in fall 1999. This information will be run through HAPEM, our exposure model to produce an exposure assessment.

NATA: Modeling (continued)

- Use air quality and exposure models (ISC3, pNEM, HEM) for source-specific assessments and to look at selected urban areas
- Use TRIM to address near-term applications
  - Capability to address human health and ecological impacts
  - Initial availability targeted for late 2000

NATA: Models3

- Building towards a future with Models3
- Currently under development in ORD and will provide:
  - Urban to Regional scale modeling in the beginning eventually neighborhood scale
  - By the end of FY00 ORD will have an operational evaluation of the models using mercury and some semi-volitales
  - Evaluation completed 2001
  - Will link this model with a human exposure model
- Includes capabilities to model ozone and $PM_{2.5}$ with toxics

The Future of the Air Toxics Program

The Future of the Air Toxics Program

- Continue to lower exposure to air toxics by reducing emissions and measuring progress by
  - Working to Complete all 10-year standards by "hammer date"
  - Working to do standards with greatest risk first
  - Remaining Risk After MACT (will require additional standards)
  - Implementing the Urban Air Toxics Strategy
  - Multi-Media Impacts (Great Waters, PBTs, & Mercury)
  - Enhancing our capabilities to characterize risk, estimate exposures, and develop tools to monitor progress
  - Developing a monitoring network
  - Effectively implementing and enforcing standards

The Future of the Air Toxics Program: Guiding Principles

- We will achieve our objectives while
  - Working cooperatively and effectively with state and local communities
  - Focusing on communities, susceptible populations, and sensitive ecosystems as appropriate
  - Providing cost-effective, common sense solutions to problems through flexible strategies wherever possible
  - Developing and executing an effective education and outreach program

The Air Toxics Strategy Brings the Pieces Together

Source-specific and sector-based Standards

National, regional, community-based initiatives

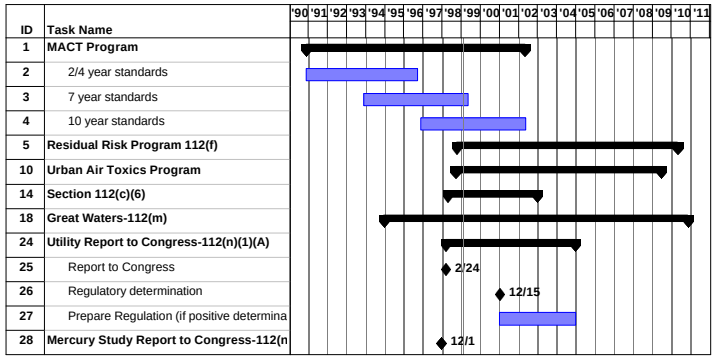
National air toxics assessments

Educational Outreach

Air Toxics Program Strategy

- Iterative and evolving process
- Uses existing programs/tools to target risk reduction
- Continually assess risk and measure progress

Changing Priorities for Air Toxics



For More Information on Air Toxics

- Visit the following websites:
  - EPA's Office of Air and Radiation (OAR)
    - www.epa.gov/oar
  - Unified Air Toxics Website (UATW)
    - repository for air toxics information
    - www.epa.gov/ttn/uatw
  - OAR Policy & Guidance Website
    - provide access to rules, policy, and guidance documents produced by US EPA Office of Air and Radiation
    - www.epa.gov/ttn/oarpg